Claims

1. A method for cutting freeform surfaces on workpieces by milling, in particular for 5-axis cutting, whereby a workpiece is cut by a tool, i.e., a milling cutter such that a desired freeform surface is obtained and whereby the tool for cutting is moved along at least one tool path, i.e., cutting path that is defined on the basis of interpolation points in relation to the workpiece, characterized in that

   a) a tool vector in the form of leading angles and setting angles is designed for each interpolation point on the tool path,

   b) a normal vector is determined for each interpolation point from the leading angles and the setting angles as well as from a drive vector determined for each interpolation point,

   c) the normal vector at each interpolation point on the tool path is used for a 3D-radius correction for compensating for deviations in dimension of the milling cutter.

2. The method according to Claim 1, characterized in that the corresponding drive vector at each interpolation point on the tool path is determined by placing a vector through the interpolation point and a neighboring interpolation point.

3. The method according to Claim 2, characterized in that the drive vector is determined for the first interpolation point on the tool path by placing a vector through the first interpolation point and the next leading angle interpolation point in the direction of movement.

4. The method according to Claim 3, characterized in that for each additional interpolation point on the tool path the drive vector is determined by placing a vector through the interpolation point and the next interpolation point to the rear in the direction of movement.

5. The method according to Claim 1, characterized in that the corresponding drive vector is determined at each interpolation point on the tool path by placing a spline through all interpolation points on the tool path whereby the first derivation of the spline in an interpolation point corresponds to the drive vector of the corresponding interpolation point.

6. The method according to any one or more of Claims 1 through 5, characterized in that for determination of the normal vector each interpolation point in a first step the tool vector of the particular interpolation point is rotated back about the corresponding drive vector by the amount of the particular setting angle, yielding a first intermediate vector for the particular interpolation point.

7. The method according to Claim 6, characterized in that then in a second step the cross product of the first intermediate vector of the particular interpolation point and the drive vector of the particular interpolation point is formed, this cross product yielding a second intermediate vector for the interpolation point.

8. The method according to Claim 7, characterized in that then in a third step the first intermediate vector of the particular interpolation point is rotated back about the second intermediate vector of the particular interpolation point by the amount of the particular leading angle, yielding the normal vector for the interpolation point.

9. A device for cutting freeform surfaces on workpieces, in particular a 5-axis cutting device, whereby a tool, i.e., a milling cutter cuts a workpiece such that a desired freeform surface is obtained, having a programming unit (10) for programming at least one tool path, i.e., cutting path through interpolation points whereby the tool for cutting is movable along the tool path or each tool path in relation to the workpiece, characterized in that a tool vector in the form of leading angles and setting angles is programmable in

the programming unit (10) for each interpolation point, and the programming unit (10) is assigned means (14) to determine a drive vector and a normal vector for each interpolation point, whereby the normal vector of each interpolation point is supplied to a 3D-radius correction unit.

10. The device according to Claim 9, characterized in that the programming unit (10) is designed for programming the tool path or each tool path as a CAD/CAM system, whereby the CAD/CAM system generates at least one APT file (11) which can be converted by at least one downstream postprocessor (15) into at least one NC file (16) executable by the cutting device.

11. The device according to Claim 9 or 10, characterized in that the means (14) that are assigned to the programming unit (10) determine the drive vector and the normal vector for each interpolation point on the tool path from the APT file (11) generated by the CAD/CAM system, whereby said means (14) supply the normal vector in the form of APT data and said APT data is transferred to an APT processor (12) which integrates this APT data into a machine-independent control file (13) such that the 3D-radius correction is executable in an NC machine (17) which includes a 3D-radius correction unit.